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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,623	02/14/2006	Alain Bergel	10404.028.00	5868
30827	7590	07/06/2010	EXAMINER	
MCKENNA LONG & ALDRIDGE LLP			ESSEX, STEPHAN J	
1900 K STREET, NW				
WASHINGTON, DC 20006			ART UNIT	PAPER NUMBER
			1795	
			MAIL DATE	DELIVERY MODE
			07/06/2010	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/523,623	BERGEL ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	STEPHAN ESSEX	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 26 March 2010.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-6 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-6 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 04 February 2005 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____ .
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)	5) <input type="checkbox"/> Notice of Informal Patent Application
Paper No(s)/Mail Date _____.	6) <input type="checkbox"/> Other: _____ .

**DETAILED ACTION**

1. The applicant's amendment filed on March 26, 2010 was received. Claims 7-18 were cancelled. Claim 1 was amended.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Claim Rejections - 35 USC § 102***

3. In view of Applicant's canceling claims 7, 8 and 18, the Examiner withdraws the previously set forth rejection of claims 7, 8 and 18 under 35 U.S.C. 102(b) as being anticipated by Zeikus as detailed in the Office Action dated November 27, 2009.
4. The rejection of claims 1-3, 5 and 6 under 35 U.S.C. 102(b) as being anticipated by Zeikus et al. (hereinafter "Zeikus") (U.S. Pat. No. 6,270,649) is maintained.

Regarding claims 1 and 5, Zeikus teaches a method of using neutral red and cells or enzymes to produce electricity comprising the steps of (a) providing an electrochemical bioreactor system (fuel cell) having a cathode compartment equipped with a cathode and an anode compartment equipped with an anode, the cathode and anode compartments being separated by a cation selective membrane; and (b) placing a suitable amount of neutral red and a biological catalyst (biofilm) in the cathode compartment (medium capable of causing the growth of biofilms). To maximize the interconversion of biochemical and electrical energy, the biological catalyst is

immobilized (formed) on the cathode. The method of the invention further comprises the step of delivering to the cathode an electric current suitable in strength to cause the reduction of at least a portion of oxidized neutral red in the cathode compartment (bias potential) (see col. 5, lines 55-56; col. 6, lines 35-57; figure 1).

Regarding claims 2 and 3, Zeikus teaches that the cathode compartment is filled with a catholyte material (medium capable of causing growth of the biofilm) such as a phosphate buffer comprising saline (seawater) (see col. 8, lines 35-48).

Regarding claim 6, Zeikus teaches that reduction of neutral red requires a potential (polarization potential)  $E_o' = -0.325$  volts.

***Claim Rejections - 35 USC § 103***

5. In view of the priority date of U.S. Pat. No. 7,122,273, the Examiner withdraws the previously set forth rejection of claim 4 under 35 U.S.C. 103(a) as being unpatentable over Zeikus in view of Chaix as detailed in the Office Action dated November 27, 2009.

6. In view of Applicant's canceling claims 9, 10 and 12, the Examiner withdraws the previously set forth rejection of claims 9, 10 and 12 under 35 U.S.C. 103(a) as being unpatentable over Zeikus in view of Worth as detailed in the Office Action dated November 27, 2009.

7. In view of Applicant's canceling claim 11, the Examiner withdraws the previously set forth rejection of claim 11 under 35 U.S.C. 103(a) as being unpatentable over Zeikus in view of Chaix as detailed in the Office Action dated November 27, 2009.
8. In view of Applicant's canceling claims 13 and 14, the Examiner withdraws the previously set forth rejection of claims 13 and 14 under 35 U.S.C. 103(a) as being unpatentable over Zeikus in view of Yoshizawa as detailed in the Office Action dated November 27, 2009.
9. In view of Applicant's canceling claim 15, the Examiner withdraws the previously set forth rejection of claim 15 under 35 U.S.C. 103(a) as being unpatentable over Zeikus in view of Sun as detailed in the Office Action dated November 27, 2009.
10. In view of Applicant's canceling claim 16, the Examiner withdraws the previously set forth rejection of claim 16 under 35 U.S.C. 103(a) as being unpatentable over Zeikus in view of Kim as detailed in the Office Action dated November 27, 2009.
11. In view of Applicant's canceling claim 17, the Examiner withdraws the previously set forth rejection of claim 17 under 35 U.S.C. 103(a) as being unpatentable over Zeikus as detailed in the Office Action dated November 27, 2009.

12. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zeikus as applied to claims 1-3, 5-8 and 18 above, and further in view of Chaix (WO02/0058221A1; see U.S. Pat. No. 7,122,273 for English translation).

Regarding claim 4, Zeikus is silent to the water being circulating water.

Chaix teaches a fuel cell with electrodes immersed in water, wherein the water is circulating water (col. 5, lines 4-9). It would have been obvious to one of ordinary skill in the art to modify the fuel cell of Zeikus with the circulating water of Chaix because the circulating water allows for effective cooling of the fuel cell (see Chaix, col. 4, lines 48-51).

### ***Response to Arguments***

13. Applicant's arguments filed March 26, 2010 have been fully considered but they are not persuasive.

*Applicant's principle arguments are as follows:*

A) *Zeikus fails to teach or suggest "forming a biofilm on at least part of the surface of said electrode ... simultaneously ... subjecting said electrode to a bias potential" as recited in claim 1.*

14. In response to Applicant's arguments, please consider the following comments:

A) Zeikus teaches a method of using neutral red and cells or enzymes to produce electricity comprising the steps of (a) providing an electrochemical bioreactor system (fuel cell) having a cathode compartment equipped with a cathode and an

anode compartment equipped with an anode, the cathode and anode compartments being separated by a cation selective membrane; and (b) placing a suitable amount of neutral red and a biological catalyst (biofilm) in the cathode compartment. Zeikus teaches that the biological catalyst may be selected from the group consisting of bacteria, archaea, plant cells and animal cells, isolated intact cytoplasmic membranes, solubilized cytoplasmic membranes, and an enzyme having a NADH or NADPH cofactor. Most conveniently, the biological catalyst comprises substantially pure or mixed cultures of cells. (see col. 6, lines 59-65). When whole cells are used as the biocatalyst, neutral red, which is contained in the catholyte solution, promotes cell growth (medium capable of causing growth of biofilms) (see col. 7, lines 3-4).

The method of the invention further comprises the step of delivering to the cathode an electric current suitable in strength to cause the reduction of at least a portion of oxidized neutral red in the cathode compartment (bias potential) (see col. 5, lines 55-56; col. 6, lines 35-57; figure 1).

### ***Conclusion***

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEPHAN ESSEX whose telephone number is (571) 270-7866. The examiner can normally be reached on Monday - Friday, 7:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SJE

/Dah-Wei D. Yuan/  
Supervisory Patent Examiner, Art Unit 1795